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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/828,292 | 04/21/2004 | Koji Shimazawa | 119514 | 4807 |

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| EXAMINER | |
|---|---|
| RENNER, CRAIG A | |
| ART UNIT | PAPER NUMBER |
| 2627 | |

| SHORTENED STATUTORY PERIOD OF RESPONSE | MAIL DATE | DELIVERY MODE |
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| 3 MONTHS | 02/26/2007 | PAPER |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/828,292 | SHIMAZAWA ET AL. | |
| | Examiner | Art Unit | |
| | Craig A. Renner | 2627 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *11 December 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-26* is/are pending in the application.

4a) Of the above claim(s) *1-12 and 18-26* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *13-17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *21 April 2004* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *21 April 2004*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

## DETAILED ACTION

### *Election/Restrictions*

1. Applicant's election with traverse of "Species III, Figure 6," upon which applicant asserts that "claims 13-17 read", in the reply filed on 11 December 2006, is acknowledged. The traversal is on the ground(s) that "the subject matter of all species is sufficiently related that a thorough search for the subject matter of any one species would encompass a search for the subject matter of the remaining species. Thus, it is respectfully submitted that the search and examination of the entire application could be made without serious burden. See MPEP §803 in which it is stated that 'if the search and examination of an entire application can be made without serious burden, the examiner must examine it on the merits, even though it includes claims to independent or distinct inventions'" (emphasis added by applicant). This argument, however, is not found to be persuasive because each of the various disclosed species details a mutually exclusive characteristic of a magnetoresistive effect element as evidenced by the representation of each various species with a different figure or set of figures. A search for one of these mutually exclusive characteristics is not coextensive with a search for the other mutually exclusive characteristics and therefore searching for all mutually exclusive characteristics could not be done without serious burden.

The requirement is still deemed proper and is therefore made FINAL. Accordingly, claims 1-12 and 18-26 are withdrawn from further consideration pursuant

to 37 CFR 1.142(b), as being drawn to one or more non-elected inventions/species, there being no allowable generic or linking claim.

***Priority***

2. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

***Drawings***

3. The drawings are objected to because of the following informalities:

a. The drawings fail to comply with 37 CFR 1.84(p)(5) because they include one or more reference signs not mentioned in the description. Note, for instance, "44" (shown in FIG. 25).

b. In FIGS. 11-14, the lead line of reference sign "22" is missing. It should be drawn to the "magnetic domain controlling layer" in order to be consistent with the remainder of the disclosure.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) and/or an amendment to the specification in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the

changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Specification***

4. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

5. The disclosure is objected to because of the following informalities:

a. In line 5 of paragraph [0034] on page 8, "antiferromagnetic layer 404" should be changed to --antiferromagnetic layer 304-- in order to be consistent with the remainder of the disclosure.

b. In line 1 of paragraph [0036] on page 8, "first gas film 305" should be changed to --first gap film 305-- in order to be consistent with the remainder of the disclosure.

c. In line 5 of paragraph [0038] on page 9, "thicknesses of G221 and G22" should be changed to --thicknesses of G21 and G22-- in order to be consistent with the remainder of the disclosure.

d. In line 6 of paragraph [0042] on page 10, "center shielding gap length Gs" should be changed to --center shielding gap length GS-- in order to be consistent with that shown in the drawings.

e. In line 3 of paragraph [0045] on page 11, "center shielding gap Gs" should be changed to --center shielding gap GS-- in order to be consistent with that shown in the drawings.

f. In line 6 of paragraph [0045] on page 11, the equation "Gs>GL" should be corrected to read --GS>GL-- in order to be consistent with the requested correction in paragraph 5e, supra.

g. In line 3 of paragraph [0049] on page 12, "center shielding gap Gs" should be changed to --center shielding gap GS-- in order to be consistent with that shown in the drawings.

h. In line 6 of paragraph [0049] on page 12, the equation "Gs>GL" should be corrected to read --GS>GL-- in order to be consistent with the requested correction in paragraph 5g, supra.

i. In line 1 of paragraph [0087] on page 18, "hemisheric" should be spelled --hemispheric--.

j. In line 9 of claim 13, "with commensurate to" should be corrected to read --commensurate with-- for better clarity.

Appropriate correction is required.

6. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is

requested in correcting any errors of which applicant may become aware in the specification.

### *Claim Rejections - 35 USC § 112*

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claims 13-17 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

a. Many elements in the claims are indefinite because they lack clear and/or positive antecedent basis including "said magnetic domain controlling films" (line 11 of claim 13), "the far side" (line 14 of claim 13), "the other second gap layer" (line 17 of claim 13), and "the MR film" (line 3 of claim 17).

b. Claims 14-16 inherit the indefiniteness associated with independent claim 13 and stand rejected as well.

### *Claim Rejections - 35 USC § 102*

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

10. Claims 13-17 are rejected under 35 U.S.C. 102(b) as being anticipated by Dill et al. (US 5,898,548).

Dill et al. (US 5,898,548) teaches a magnetoresistive effective element comprising a first shielding layer (S1), a second shielding layer (S2), a magnetoresistive effective film (includes 116, 118, 120 and 132, for instance), a first gap layer (104), a pair of magnetic domain controlling layers (each 150), and a bottom electrode layer (102), the first shielding layer and the second shielding layer being disposed by a given distance (S), the magnetoresistive effective film being disposed in between the first shielding layer and the second shielding layer (as shown in FIGS. 4A and 4B, for instance), the first gap layer being made of electrical conductive material (lines 22-23 in column 9, for instance, i.e., "Cu", for instance, is an electrical conductive material), and formed on the magnetoresistive effective film with commensurate to a surface configuration of the magnetoresistive effective film (as shown in FIG. 4A, for instance), the magnetic domain controlling films being disposed at both sides of the magnetoresistive effective film, respectively (as shown in FIG. 4A, for instance), the bottom electrode layer being electrically connected to the magnetoresistive effective film in the far side from the first gap layer (as shown in FIG. 4B, for instance), constituting one second gap layer (102), the second shielding layer functioning as a top electrode layer electrically connected to the first gap layer (lines 25-31 in column 5, for instance), constituting the other second gap layer (104) [as per claim 13]; wherein the magnetoresistive effective film is made of a spin valve film or a ferromagnetic tunnel junction film (lines 14-17 in column 1, for instance, i.e., a ferromagnetic tunnel junction

film) [as per claim 14]; wherein the first gap layer is made of metal (lines 22-23 in column 9, for instance, i.e., "Cu", for instance, is metal) [as per claim 15]; wherein a total thickness of the magnetoresistive effective film and the first gap layer is set larger than a thickness of the magnetic domain controlling layers (as shown in FIG. 4A, for instance) [as per claim 16]; and wherein both sides of the second shielding layer are depressed at both sides of the MR film in a front view, respectively (as shown in FIG. 5, for instance) [as per claim 17].

11. Claims 13-17 are rejected under 35 U.S.C. 102(b) as being anticipated by Hayashi et al. (US 2002/0008016).

Hayashi et al. (US 2002/0008016) teaches a magnetoresistive effective element (Fig. 8, for instance) comprising a first shielding layer (1), a second shielding layer (12), a magnetoresistive effective film (includes 3, 4, 5 and 6, for instance), a first gap layer (7), a pair of magnetic domain controlling layers (each 9), and a bottom electrode layer (22), the first shielding layer and the second shielding layer being disposed by a given distance (as shown in Fig. 8, for instance), the magnetoresistive effective film being disposed in between the first shielding layer and the second shielding layer (as shown in Fig. 8, for instance), the first gap layer being made of electrical conductive material (paragraph [0155], for instance, i.e., "Cu," for instance, is an electrical conductive material), and formed on the magnetoresistive effective film with commensurate to a surface configuration of the magnetoresistive effective film (as shown in Fig. 8, for instance), the magnetic domain controlling films being disposed at both sides of the

magnetoresistive effective film, respectively (as shown in Fig. 8, for instance), the bottom electrode layer being electrically connected to the magnetoresistive effective film in the far side from the first gap layer (as shown in Fig. 8, for instance), constituting one second gap layer (22), the second shielding layer functioning as a top electrode layer electrically connected to the first gap layer (as shown in Fig. 8, for instance), constituting the other second gap layer (7) [as per claim 13]; wherein the magnetoresistive effective film is made of a spin valve film or a ferromagnetic tunnel junction film (as shown in Fig. 8, for instance, i.e., a ferromagnetic tunnel junction film) [as per claim 14]; wherein the first gap layer is made of metal (paragraph [0155], for instance, i.e., "Cu," for instance, is metal) [as per claim 15]; wherein a total thickness of the magnetoresistive effective film and the first gap layer is set larger than a thickness of the magnetic domain controlling layers (as shown in Fig. 8, for instance) [as per claim 16]; and wherein both sides of the second shielding layer are depressed at both sides of the MR film in a front view, respectively (as shown in Fig. 8, for instance) [as per claim 17].

***Claim Rejections/Considerations - 35 USC § 103***

12. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

***Pertinent Prior Art***

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. This includes Murdock (US 6,430,010), Mao (US 6,466,419), Mao (US 6,700,760), Chang et al. (US 6,943,993), Hayashi et al. (US 2003/0035256), Meguro et al. (US 2003/0206383), and Nakamoto et al. (US 2004/0100737), which each individually teaches a current-perpendicular-to-plane giant magnetoresistive effect element with an upper shielding layer including side shielding features.

***Conclusion***

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Craig A. Renner whose telephone number is (571) 272-7580. The examiner can normally be reached on Tuesday-Friday 9:00 AM - 7:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hoa T. Nguyen can be reached on (571) 272-7579. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Craig A. Renner
Primary Examiner
Art Unit 2627

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